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FIVE NEW SPECIES OF TRACHELOMONAS.

BY T. CHALKLEY PALMER.

American forms of the genus *Trachelomonas* (Ehr.) Stein, though apparently not infrequent or wanting in variety, seem not to have been studied with any great degree of enthusiasm. The number of recognized species is small. Moreover, it is somewhat doubtful if known forms have been quite adequately distinguished and characterized. Since the days of Ehrenberg, also, the chemical constitution of the shells of *Trachelomonas* has been the theme of a continued, though desultory, discussion.

No attempt will be made, in this preliminary paper, to deal with the genus as a whole, or to discuss the values of characters relied upon for specific diagnosis. It will suffice for present purposes to take *Trachelomonas* as established by Ehrenberg, together with the same author's genera, *Lagenella, Chætotyphla* and *Chætoglena* as constituting one genus, the *Trachelomonas* of Stein and of most subsequent authorities. Neither is it necessary to enter here at length into the subject of the constitution of the lorica. This matter is, indeed, by no means simple; and certainly, it is not one capable of being decided, as to every species, by a few rough chemical tests upon the shells of one or two forms. The shells of *Chætotyphla* and *Chætoglena* were supposed by Ehrenberg to be silicious. On the other hand later investigators have found it possible to dissolve, wholly or in part, the shells of certain of these forms in acids. I have no notion of calling in question the correctness of any of these observations at present.

The lorica, however, in each of the five species now to be described is completely silicified. If this had not been the case, the following descriptions would not have been written now and in this form; for these five were selected from among about twenty, all appearing in a preparation of diatoms that had been strongly boiled for some time in a large volume of concentrated nitric acid, to which had been added, from time to time, small pieces of potassium chlorate. Moreover, subsequent experiments showed that the original material yielded the same shells, intact in every least feature, after long boiling in a mixture of equal parts of concentrated sulphuric acid and bichromate of potash. Other portions of the material were acted upon by both solutions in turn. Last of all the shells, after these processes, were mounted on a thin cover-glass, and this glass, supported on platinum, was brought to a low red heat, with incipient softening, and kept there for fifteen minutes. The loricæ emerged unaltered from this ordeal, in no way differing in this respect from the frustules of diatoms accompanying them. Whatever may be the case with other forms, therefore, the loricæ here described are neither chitinous nor calcareous but silicious. The material from which these forms were obtained came from Ancora, N. J. It was pointed out to the writer by Mr. C. S. Boyer, in the spring of 1897. It is in form of a grayish, paper-like film, and it completely covered many acres of boggy ground. It is made up mostly of the frustules of *Eunotia pectinalis* Kg., lined with the dead endoplasm and varnished over with coleoderm. This diatom, during the colder months, thrives enormously in the flooded cranberry bogs, and dies *in situ* when the water is drained off for the growing season. In addition to the *Eunotia,* the gathering contains the remains of various rhizopods, besides spicules of indeterminate origin, miscellaneous diatoms and *Trachelomonas.*

It is recognized that complete descriptions of the following species must include an account of the protoplasmic contents of the loricæ. This cannot be given here, for the reason that the organisms were long since dead and shrunken. Portions of the gathering were, however, macerated with water, and in some of the numerous forms enough was seen of the contents to indicate that the body of the living animal contained a quantity of deep-green chlorophyll, a part of which still survived. A final decision as to the allegiance of these forms must, undoubtedly, await a study of them in their living state. But the whole structure of the hard parts points to *Trachelomonas,* and the name is given with some confidence

Measurements are observed maxima in all cases. The total size will vary downward in different specimens of a given species, and with it, mostly to a corresponding degree, the dimensions of salient features.

Trachelomonas vestita n. sp. Pl. XXXV, figs. 1 and 2.

Lorica a sphere, opaque in air, with a prolonged, neck-like aperture. Walls of sphere complex, greatly thickened by a complete layer of radiating, closely compacted silicious rods or spicules. General surface of spicular coating showing numerous rounded and confluent terminations, with often a few more prolonged and somewhat spine-like. Neck transparent, finely striated longitudinally, flaring, with rounded, everted and somewhat reverted, finely fluted lip.

Diameter, including spicules, ...	25 μ.
Length of spicules, ...	2.5 μ.
Length of neck beyond spicules, ...	6.5 μ.
Diameter of lip, ...	7 μ.

Bogs, Ancora, N. J.

Mounted in air the lorica shows yellowish-brown by transmitted light, bluish-green with a brown edge with spot-lens, and white on dark background with reflected light. In Canada balsam, colorless[1] and with a conspicuous spicular halo.

Trachelomonas spiculifera n. sp Pl. XXXV, fig. 4.

Lorica spherical. Wall thickened by a layer of radiating, compacted silicious spicules, less long than in *T. vestita.* Surface of spicular coating showing round, evenly sown, mostly isolated grains, the terminations of spiculæ. Aperture small, situated in a hyaline, nearly flat, crater-like area, with an upward-sloping, hyaline edge, which is circular or generally irregularly polygonal.

Diameter of sphere, ...	25 μ.
Diameter of crater, ...	7 μ.
Length of spicules, ...	1.25 μ.

Bogs, Ancora, N. J.

Mounted in air the lorica is slightly tinted with chocolate by transmitted light, light bluish-green with spot-lens, and nearly white on dark background with reflected light. In Canada balsam, colorless and with a spicular halo.

Trachelomonas vermiculosa n. sp. Pl. XXXV, fig. 3.

Lorica nearly spherical. Walls somewhat thin, general surface nearly smooth, at maturity adorned with high, rounded, isolated vermiform ridges. Aperture quite small, without crater-like area, the edge slightly raised, smooth and rounded.

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[1] Color-effects with these silicious loricæ are no doubt due to refraction, interference, etc., and are serviceable or significant in specific diagnosis only to a very limited extent.

Diameter of sphere,	23 μ.
Height of surface ridges,	2 μ.
Diameter of aperture at top,	2.5 μ.

Bogs, Ancora, N. J.

Mounted in air the lorica has a purplish tinge with transmitted light, is purple to yellow with spot-lens, and sometimes violet with top illumination. In Canada balsam, colorless.

Trachelomonas spinosa n. sp. Pl. XXXV, fig. 6.

Lorica spherical, with long, slim neck. Walls transparent, somewhat granulate; spines about 10, hollow, nearly straight, slender, evenly tapering, distributed symmetrically. Neck with a strengthening ring of silica near the top. Aperture small.

Diameter of sphere,	13 μ.
Length of neck,	7 μ.
Greatest length of spines,	12 μ.

Bogs, Ancora, N. J.

Mounted in air, the lorica is nearly colorless by transmitted light, shining purple to violet with spot-lens and with top illumination on dark background. In Canada balsam, colorless and very faint.

Trachelomonas minor n. sp. Pl. XXXV, fig. 5.

Lorica spherical, with long, slim neck and one very long caudal spine. Walls transparent, surface showing a few isolated granules. Neck cylindrical, with capillary tube. Caudal spine nearly straight, or somewhat bent or spirally twisted, hollow.

Diameter of sphere,	9 μ.
Length of neck,	5 μ.
Length of spine,	17 μ.

Bogs, Ancora, N. J.

Mounted in air or in Canada balsam the lorica gives color-effects like those of *T. spinosa.*

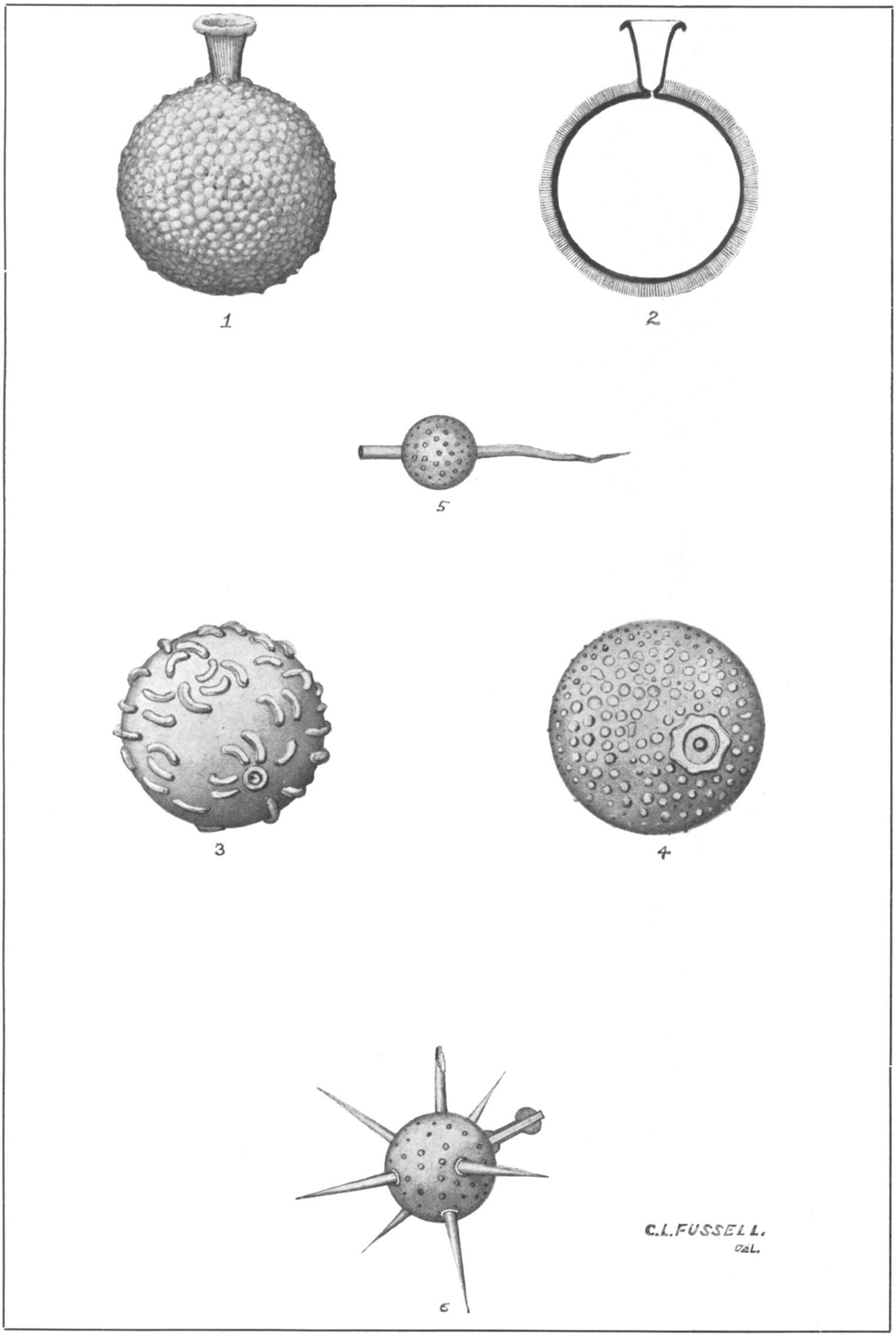
Of the above, *T. spiculifera* and *T. spinosa* are fairly plentiful in the Ancora diatomaceous gathering, while *T. vestita* is not so abundant and *T. minor* may be called scarce. *T. vermiculosa* is about as plentiful as *T. vestita.* All five, however, are represented by numerous specimens, and a great many of each were studied with care. No wide variations from the types, as above given, were found in any of the five species, except in point of size as already mentioned, and to a minor degree in perfection of development, though not in character, of the surface markings. In particular, there seems to be no tendency toward intergradation in case of any of those here described, or among the other very numerous kinds, to be described in a future communication, which accompany them in this remarkable gathering.

In addition to the numerous forms from Ancora, N. J., others equally silicious, but quite distinct specifically, have been detected in small numbers among diatomaceous material from bogs and ponds over a wide range of country. All these are being made the subject of a careful study, the results of which are to be set forth in a future paper. Unmounted fresh material, preserved in formalin, which from its origin may be supposed to contain those organisms, is greatly desired by the writer.

EXPLANATION OF PLATE XXXV.

The figures are drawn to a uniform scale, an enlargement of 1200 diameters.

Fig. 1.—*Trachelomonas vestita* n. sp.
Fig. 2.—*Trachelomonas vestita* optical median section.
Fig. 3.—*Trachelomonas vermiculosa* n. sp.
Fig. 4.—*Trachelomonas spiculifera* n. sp.
Fig. 5.—*Trachelomonas minor* n. sp.
Fig. 6.—*Trachelomonas spinosa* n. sp.



C.L. FUSSELL, del.

PALMER ON TRACHELOMONAS.